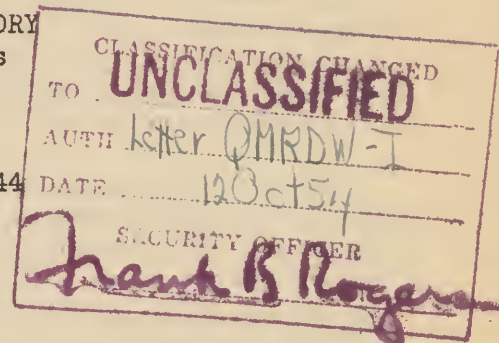


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Army Service Forces  
Quartermaster Corps  
CLIMATIC RESEARCH LABORATORY  
Lawrence, Massachusetts

Monthly Report - 1 May 1944



1. Personnel

a. The following reported for duty:-

Lieutenant E. M. Armstrong, QMC, Adjutant and  
Detachment Commander  
Five Enlisted Men  
Miss Mildred Burnett, Report Analyst

b. Five enlisted men have been selected and are receiving their basic training at Camp Lee, Virginia. Four enlisted men have been selected at Fort Devens and are awaiting orders for basic training. This completes, with but one exception, the allotment of fifty-five men allowed this organization.

2. Equipment

a. The Brown Flight Recorder has been installed and is working most efficiently.

b. The Comfort Temperature Room is finished and is in use for the study of handgear and clo determinations.

c. The Barracks and Day Room for the enlisted personnel are finished and taken over from the Engineers.

3. Reports

The following reports have been sent to the Office of The Quartermaster General, for the approval of Colonel G. F. Doriot.

Report No. 76 - 15 April 1944

Thermal Insulation of Cold Weather Clothing and Footgear  
Theoretical Considerations  
Four Tables and One Figure

The possibilities and limitation of protection against cold afforded by footgear and cold weather clothing have been analyzed by theoretical and experimental methods at ambient temperatures which vary between plus 20°F. and minus 20°F., and at a barometric pressure of one atmosphere.

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## R E S T R I C T E D

It has been found that a shape factor (the effect of the dimensions of the object to be insulated against cold) imposes a severe limitation on the maximum possible clo value of footgear. This value is similar to that found for mittens - about 2.0 clo. In the case of cold weather clothing the shape factor as well as the heat loss from the face have been found to be largely responsible for the low clo value of the ensemble.

A method of calculating average footgear tolerance times at all ambient temperatures has been developed, and appears valid on the basis of present data collected in this laboratory. If further data substantiate this method it will prove a useful way of determining the thermal protection footgear provides against cold. This should reduce the amount of physiological testing necessary to gather comprehensive data regarding many items under test.

Report No. 57 - VII - 29 April 1944  
Pile Clothing, Experimental  
Comparative Study of Thermal Insulation  
Twelve Tables - One Figure

Six types of experimental pile fabrics and the standard alpaca pile have been studied. The experimental piles were identified by the following:

5/8" 100 percent single-faced wool pile  
Double-faced wool pile  
5/8" 50-50 pile  
3/8" 50-50 pile  
5/8" 100 percent mohair  
Alpaca napped-back

Statistical considerations of the thermal insulation of the seven types of pile fabrics revealed the following:-

(1) The single-faced, 100 percent wool provided best insulation. It was found to be significantly warmer than any of the other pile fabrics tested.

(2) Each type of 100 percent wool pile (single-faced and double-faced) was significantly warmer than the standard alpaca pile.

(3) The 100 percent mohair pile appeared to be warmer than the standard alpaca pile. This difference, however, was only of borderline statistical significance.

(4) The napped-back alpaca pile was less warm than the double-faced wool pile but warmer than the standard alpaca pile. These differences, however, lacked statistical significance.

R E S T R I C T E D

(5) There was no significant difference between the standard alpaca pile and the two 50-50 piles. Nevertheless, the shorter 50-50 pile (3/8") appeared slightly inferior on the basis of tolerance times.

The design and fit of the several garments as well as certain physical characteristics of the pile fabrics were also studied.

The design of the pile jackets was not satisfactory. The width across the shoulders was inadequate which produced a poor fit. Each of the piles, except the 100 percent wool items, crept badly when worn snugly against the underlying garments.

Compressibility of the fabrics was determined under loads of 0.1, 0.2, 1.0 and 2.0 pounds, respectively, per square inch. A high degree of correlation was demonstrated between thickness under load and relative thermal insulation.

The effect of laundering on the size and thickness of the pile clothing was studied. Shrinkage was observed to be slight and similar for each type of pile. Changes in compressibility following as many as three launderings were not judged to be of practical significance.

Thermal insulation of the single-faced and double-faced wool pile was determined after one laundering for comparison with results obtained prior to laundering. It was concluded that a single laundering of 100 percent wool pile produced no significant change in the amount of thermal protection provided.

4. In the Provisional Reports during the past month, tests on the following items were discussed:

Cold Climate Clothing  
Hospital Ward Tent  
Mittens and Gloves, Wet and Dry  
Solid Fuels, Nine Brands or Types  
Experimental Cotton Clothing, Water Repellency  
Goggles  
Field Cap  
Snowshoes and Ice Creepers  
Reflecting Cloth  
Hood for Field Jacket  
Sizing of Bag, Sleeping, Mountain  
Face Masks  
Wool Overcoat, Roll Collar versus M-1943 Field Jacket

JOHN H. TALBOTT  
Lt. Col., M. C.  
Commanding